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THE MAC Flyer

For Greater Safety in MAC Air Operations

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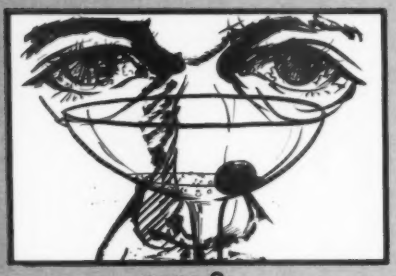

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The MAC IG on Safety

Interview Conducted by Capt. Byron L. Howard

(Editor's Note: Brig. Gen. William H. Sistrunk became the MAC Inspector General earlier this year. This candid interview is an opportunity for us to get an inside look at his views on safety in MAC.)

***TMF*—General Sistrunk, would you first tell us a little about your flying background.**

IG—Most of my flying experience is in MAC aircraft. In 1961, I joined the 63 MAW, then located at Donaldson AFB, Greenville, South Carolina, and flew the C-124. From there I moved a number of times with the 63 MAW, including moves to Hunter AFB near Savannah, then Norton AFB, where the wing transitioned to the C-141. I flew the C-9 at Scott in the late 1960s and early 1970s, and the C-5 at Dover while the vice wing commander and wing commander. I also flew the C-118 while stationed at the Pentagon. I've logged about 6,500 flying hours.

***TMF*—What instances in your career made a safety believer out of you?**

IG—I'm fortunate. I never had a catastrophic emergency during my career. Probably my most serious problems required shutting down an engine, and of course my training allowed me to take care of those types of things. I have consciously tried throughout my career

Brigadier General William H. Sistrunk

to learn from the lessons of other mishaps.

As the MAC IG, I am often reminded of the high priority of safety. From my past, I can remember commanders talking to us about safety early in my career, and they made the results of a mishap seem so unpleasant that those memories stuck with me. Let me give you an example.

I recall mishaps caused by pilots landing with the gear retracted. People *still* land with the gear up. I just can't imagine that happening to me because of the attention I have always given and would give to that particular item on the checklist prior to landing, and the number of crosschecks that are available to the crew. Somewhere back in my career, checking and double checking the gear was something that was imbedded in my mind. I think if we discuss mishaps more—spread the word, show pictures, perhaps listen to tapes of mishap investigation briefings—it'll have the same kind of impact.

Part of mishap prevention is spreading the word; of trying to get the point across of balancing good judgment and pride. You just can't allow poor judgment to overrule sound safety practices.

***TMF*—Speaking as a previous commander, how do you view the commander's role in safety?**

IG—Quite simply, safety must be a commander-sponsored program! It is his or her responsibility, and it should have the commander's stamp all over it! It's got to have his or her "twist" to it, including the commander's undivided attention on a daily basis. But a commander's program won't be effective if it is not well-received by people. You can talk about it *too* much and it becomes meaningless; it goes in one ear and out the other. So, I caution commanders to be very careful about how they *develop* and *present* their safety program.

You can have the very best safety program on paper, but if it isn't well received by the members of the unit in a way that will encourage them to be safety conscious, then that commander and his safety officers and NCOs may be on the wrong track to mishap prevention. I've thought long and hard about this—how does the commander develop a good safety attitude throughout an organization? Developing that attitude, along with communicating and spreading the word, are keys to mishap prevention, and it relates *directly* to how well the *commander leads*—one of his *biggest responsibilities*!

***TMF*—MAC's flight safety record is not as good today as it has been in previous years. What are our problems in flight safety?**

IG—We're seeing an increase in operations-related mishaps. That's the human factor. A lot of effort went into the CINCMAC-directed C-130 Executive Review earlier this year, and a lot of good things came out of it: A sense of direction for operations, stan-eval, training, personnel issues, and human factors inputs from the surgeon general. We may not have all the answers yet, but we must constantly work this particular safety issue. In my opinion, it will still be the commander's leadership ability that will foster that desired safety program.

I'm talking about that intangible portion of a safety program—the people's *willingness* to be safe rather than acting safe to avoid punishment. Show me a program that is effective, and I'll show you a commander that has found that key to success in safety. I know of a few units that illustrate that willingness, and their safety successes will parallel their positive safety awareness attitude.

***TMF*—What is our biggest obstacle in mishap prevention?**

IG—Obstacles can come in many forms—like the demands we put on our people. How tired are they? How much stress have they been under? How much risk are we asking them to assume? If you put on the pressures in all these areas, you tend to chip away at that thing I alluded to called "safety attitude." I think the biggest obstacle to mishap prevention is keeping that safety attitude up. So, if that's the obstacle, how do we overcome it?

That's another great challenge to our field commanders who are closer to our people in the high-risk areas. Can they develop a spirit of pride, high morale, and an attitude of winning *big*—a combination of success that makes it easier for people to accept willingly the call to be safe?

***TMF*—There has been and continues to be a conflict among some crewmembers between moving the mission—the on-time departure criteria—and doing the job safely. Some crewmembers feel that by doing one, you compromise the other. How do you view that statement?**

IG—I've heard that subject for years, and I think the impact of it will vary according to the experience level of the individual. Yes, there is pressure to move the mission on time; that's part of our job. However, you should never compromise safety for the sake of an on-time departure. The person who allows that to happen doesn't have the big safety picture I've been talking about. It's like the crew on final approach in a hurry to get the plane on the ground and knowing they've got a problem. Instead of entering a holding pattern, fixing the problem, and then making a normal approach, they continue to hurry, getting farther and farther behind each second. The person who allows this to happen can't overcome the pride in some cases and task saturation in others to discontinue their dangerous path. Eventually, their luck runs out and a mishap occurs. It can happen on takeoff as easily as a during landing. I hope the people we certify as aircraft commanders, instructors and evaluators understand that, too. I sure made it a point to tell them at my cert boards.

***TMF*—What will be the overall thrust of your safety efforts as MAC's Inspector General?**

IG—You've heard me talk a little about it already. I and everyone on my staff represent the CINC and his views on safety, as well as evaluating how well we perform our (MAC's) mission. Our job is to preserve our mission capability—the people and the material resources that give us this capability. Both are valuable and, sometimes, they can't be replaced. So our best option is to keep our people safe and our aircraft ready to fly. Every commander and supervisor shares this great responsibility. I believe if I could personally talk to everyone one-on-one in this command—from the newest airman right out of tech school all the way up the chain—I could instill a sense of effective safety awareness in them. You have to think safety awareness from the time you wake up until the time you retire again after a long day's work. *I'd like our people to understand the value of being safe rather than the consequences of not being safe.* So, my overall thrust as the IG will be to continue to spread the safety philosophy, emphasizing the commander's initiative that he or she is the chief safety officer in that unit. But they can't do it all alone—everyone must be singing from the same sheet of music before mishaps will decrease!

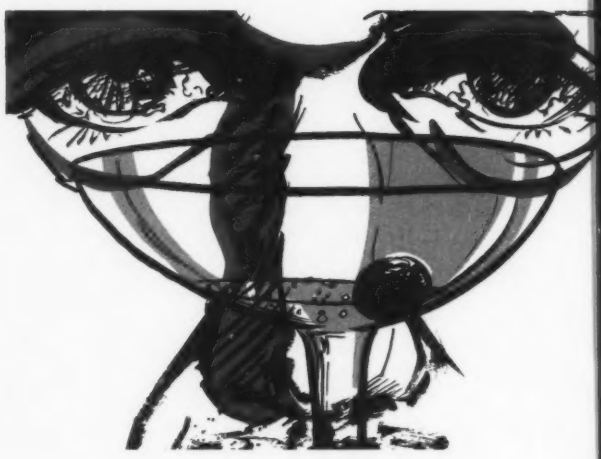
Should You Study For... An Alcohol Test

He looked and felt like death warmed over. Walking away from the Herk after a 14-hour, three-hop mission (the first two sorties included multiple low-level routes to simulated heavy equipment drops), the C-130 IP could hardly wait for a cold one. His right seater, a brand-spanking new second lieutenant in the copilot upgrade program, was nearly ineducable and he felt the fledgling aviator should have been washed out of UPT. Besides, it was a Friday afternoon during the hottest July in memory, and the "E" model's air conditioner hadn't worked right all day.

The IP was still mad about being "volunteered" for this Fourth of July static display mission. It really steamed him. Here was a three-day weekend shot just so some new squadron copilot could fill a few training folder squares. (The copilot got the mission because his fiancee lived near the enroute RON base; the IP got the mission because the copilot needed the training.)

If any IP ever deserved a brew (no light beers, please), he did! After logging in with base ops, he phoned his home station command post, then told his crew to report back at 1200 hours for tomorrow's flight to the next base and their static display duty. He followed this with a point-to-point to the BOQ where no small quantity of carefully brewed, aged and chilled amber liquid awaited his arrival.

After a long, hot dusty bag drag to billeting, it took only six seconds for the IP to open his room, the refrigerator, and a cold one. He was so dry the cold liquid contents of the chilled bottle were nearly absorbed through the glass directly into his hand as he raised the bottle to his lips. It only took a few seconds to suck down *the* most satisfying beer he'd had in years. Bringing the now empty bottle down from his mouth, he caught a glance of his watch—nine hours and 30 minutes before tomorrow's report, 11 hours and 45 minutes until takeoff (assuming takeoff was 2+15 after crew report).



1. If the IP drinks no more, _____.

a. he is perfectly legal to report in nine and a half hours (takeoff in 11+45).

b. he should report ten hours from now (takeoff in 12+15).

c. he should report 12 hours from now (takeoff in 14+15).

d. he's okay as long as he doesn't drink within 50 feet of the airplane.

Almost as hungry as he was dry, our IP opened another bottle as he reviewed his dinner options. Because he had no transportation and was unfamiliar with the local area, he selected the O-Club. He nursed his second beer as he unpacked (darn, forgot the shoes), showered, and dressed for the evening. He emptied a third bottle during the short walk to the club. It was a typical officers' club, and there were about a half dozen people inside.

Despite the overwhelming numbers, he spied the lone female at the bar. Our intrepid aviator nestled up and in a voice two octaves lower than normal said, "Hi! I'm a Hercules IP." Impressed, she bought him a drink. A lively conversation then followed about the inherent dangers of flying C-130s. Sensing he was on a roll, our IP finished his fourth drink (eight hours and 30 minutes to

by Maj Peter G. Gavornik
AFSC, Wright-Patterson AFB, OH

report time, now) and suggested dinner together.

2. If the IP drinks no more _____.

a. he is legal to report eight and a half hours from now (takeoff in 10+45).

b. he should report nine hours, 45 minutes from now (takeoff in 12+00).

c. he should report ten hours from now (takeoff in 12+15).

The young lady accepted the IP's dinner offer and he escorted her to a table. Being quite continental, he read the menu out loud. She romantically suggested sauerkraut and knockwurst for two with a carafe of "Chateau Thunderfowl" wine. He concurred. During the meal, he encouraged her by playing footsie under the table and, emptying his last glass of wine, suggested they adjourn for drinks and dancing. (Report time is now seven hours away.)

1. If the IP drinks no more _____.

a. he is legal to report seven hours from now (takeoff in 9+15).

b. he should set the report at least ten hours from now (takeoff in 14+15), longer if he's had too much to drink.

c. he must set the report time back at least 12 hours (takeoff in 14+15) although he neither feels nor appears "intoxicated."

d. it's okay as long as he doen't drink in the airplane (pull tabs can cause serious FOD problems).

Amazingly, the young lady refused his offer, explaining she was already late to meet her fiance, a C-130 copilot visiting on a weekend cross country. Besides, her mother always warned her not to go out with men wearing combat boots.

The Answers

1. b 2. c 3. b

AFR 60-16, para 5-1a, states in part, no person may act as a crewmember "while under the influence of alcohol or its aftereffects." The reg also says we must, except as amended elsewhere, comply with the FARs (Federal Aviation Regulations). FAR 91-11 also prohibits performing crew duties ". . . while under the influence of alcohol (including its aftereffects)."

MAC has refined this guidance in its 55-series regulations which read in part, "Crewmembers will not be scheduled to fly nor will they perform crew duties after consuming alcoholic beverages within ten hours of mission reporting time or when under the influence of alcohol." The last phrase is the kicker. Depending on the amount of alcohol consumed, you can still be under the influence *up to 48 hours after your last drink.* Simulator testing has shown that even after moderate drinking (a blood alcohol content of .08 or roughly four beers for a 150-pound person), some pilots showed significant performance impairment for up to 18 hours. Even though all measurable alcohol has left your body, you still suffer residual effects. *(Editor's Note:* See "Residual Effects of Alcohol on Aircrew Performance," *TMF*, February 1985.) You've experienced these effects if you've ever had a hangover the day after. Much in the same way a punch in the nose hurts long after the fist is removed from your face, your brain and other organs smart long after all alcohol is removed from the body. Given the many variables and lack of useful technique to quantify "under the influence," what should a conscientious MAC crewmember do?

Most experts emphasize the importance of conservative use of alcohol *24 hours* prior to flight duties, and recommend abstinence for 12 hours prior to reporting. MAC regulations require abstinence for ten hours. But as always, the bottom line is this: proper use of alcohol is an individual crewmember responsibility—as it always has been.

Mishap With A Moral

The pilot must insist ...

Talk To Me!

On 13 June 1984, the crew of Flight 183, aboard a DC-9, experienced the results of cockpit information mismanagement. They took off at 1537 with 51 passengers and headed for the Detroit Metropolitan Airport. Typical for the summer, the weather forecast included "quite a few scattered afternoon and evening thunderstorms, possibly severe." The enroute portion verified this weather forecast. Approximately 90 miles from Detroit,

the crew identified scattered thunderstorms, most of them west of the field. Tuning in the Automatic Terminal Information Service (ATIS), they heard information "charlie," which stated weather conditions were 4,500 feet scattered, visibility 7 miles, wind 280 degrees at 13 knots, and that the Instrument Landing System (ILS) approaches were in effect for runways 21L and 21R. As Flight 183 drew nearer the field, the crew observed a thunderstorm seven miles in diameter just west of the airport.

The crew began an ILS approach to 21R and at 1650 Eastern Standard Time (EST) they descended first to 3,000 feet, then 2,600 feet. While in the descent they entered a nearly solid cloud deck. The flightcrew continued to observe area thunderstorms on radar, noting a thunderstorm west of the field produced the strongest returns. As they discussed its location 10 NM away, the controller announced "Metro visibility is 2 miles." A Learjet on an ILS approach to runway 21L at the same time asked the controller for a weather update. The controller responded with current conditions, including: ". . . thunderstorm in progress."

The captain of Flight 183 understood the discussion related to weather at the airport, but since the Learjet was landing on runway 21L he assumed the information did not apply to runway 21R. The first officer later said he couldn't determine the thunderstorm's location from the discussion. Neither pilot requested additional weather information. At 1653, the crew discussed missed approach procedures for runway 21R, and their concern about the thunderstorm west of the field. As they talked, the controller announced airport visibility had decreased to 1 mile. The first officer stated later he observed cells on their final approach path, but didn't consider them an impediment to landing. The crew tuned in the local tower frequency and heard: "winds are 320 degrees at 26, peak gusts 36, north boundary winds 270 degrees at 16, east boundary winds 310 at 8, south boundary winds 290 degrees at 22." The flightcrew stated they recalled the transmission but *didn't consider it a wind shear alert.* The captain said the transmission indicated rapidly shifting winds, and the first officer said he thought it was *merely additional wind data.* At 1655 the captain said "It's going to get choppy. . . here in a minute. . . ."

Flight 183 then broke out of the clouds momentarily, and the crew could see a low gray-white layer of clouds along the localizer course to 21R. At 1655, the first officer said "runway approach lights in sight." At this time the controller stated that she observed the airport visibility had dropped to one-quarter mile because of rain. Flight 183 entered the low-lying clouds about 350 feet above the ground, and simultaneously encountered heavy rain, hail and turbulence.

The captain lost sight of the runway environment and immediately started a missed approach. He called for gear up, advanced the throttles to the mechanical stops and rotated the aircraft to a 15° nose-up attitude. He noted the indicated airspeed increased to about 140 knots. After passing the middle marker, the airplane flew out of the rain and hail shaft and the pilot saw the runway. He felt the aircraft was still descending and contact with the runway was inevitable. The captain then ordered "down the gear, down the gear." Following this command, he pushed the nose over to ensure a level touchdown, and pulled the thrust levers back to reduce power.

The DC-9 landed at 1656, about 2,000 feet beyond the threshold of runway 21R, with its gear partially extended. The airplane skidded about 3,800 feet on the runway before sliding into the grass on the left side of the runway. There were no fatalities or serious injuries. although three crewmembers and seven passengers suffered was severely damaged.

Analysis

The National Transportation Safety Board (NTSB) focused their investigation on the factors impinging on the pilots' decision-making processes and flying abilities.

Weather—The mishap flight crew observed a contouring cell about 5-8 miles west-southwest of Detroit. This storm was not reported via ATIS because of the rapid development of the storm cell and the ground clutter on the Detroit radar which prevented the observer from receiving a true radar picture of the airport proper. The captain of another plane, just behind Flight 183, saw a cell of "significant intensity" moving across the northern portion of the field via his weather radar at the time of the accident.

The Detroit NWS station visually observed a thunderstorm three miles west of the field at 1635.

The board concluded the thunderstorm which affected Flight 183 was part of an area of scattered cells which were observed as early as 1615 by pilots and ground observers. The thunderstorm, which was over the airport at 1656, intensified rapidly as it approached the field from west to east. The board further concluded the storm was of VIP level 4 and traveling at about 30 knots. The VIP level was confirmed by a 1730 weather radar observation and the associated heavy rain, 3/4-inch hail, and wind gusts up to 42 knots. The center of the cell passed over the approach end of runway 21L, which placed the rain and hail shaft in the path of Flight 183.

Airplane Performance—Analysis of flight data recorder information revealed conclusively the aircraft was subjected to wildly divergent winds characteristic of microbursts as it passed through the heavy rain and hail. It confirmed the captain's assessment of the airspeed increase to 143 knots followed by a rapid decrease to 119 knots. The data clearly indicated, however, that the aircraft remained in level flight, even as the airspeed decayed. Yet even with maximum power the aircraft didn't achieve a positive climb rate. In fact, the airspeed decreased at a rate of 2 knots/second. (In no-wind conditions, the aircraft would have been accelerating at about a 4 knots/second rate). This revealed a severe wind shear with an actual wind change of about 6 knots/second! The NTSB concluded the pilot probably averted a catastrophy by initiating the go-around. As the aircraft flew out of the rain and hail shaft, the pilot perceived a decrease in airspeed and a continued descent.

The captain was the victim of a visual illusion. As the aircraft emerged from the weather, his visual clues increased rapidly, giving him the sensation he was approaching the ground. Meanwhile, the cockpit instruments available to both pilots showed level flight. Given the captain's perception of the circumstances, his decision to lower the gear and reduce power was appropriate. The flight data recorder, however, showed that even when he reduced power, the IAS actually increased, supporting the analysis

The NTSB felt a well-trained, alert captain should have been aware that the airplane would resume positive performance after exiting a microburst. They felt the captain should have continued the missed approach once he initiated one. By reducing power, however, the pilot committed the aircraft to landing before the gear was down. The safety board felt the pilot's knowledge he was over the runway should have mediated his decision. A worst-case scenario would have entailed a "touch and go," but still would have allowed sufficient airspeed to execute a safe missed approach.

The safety board felt, in this instance, that the overriding factor which should have affected the pilot's decision was the location of thunderstorms near the airfield. The crew was aware a thunderstorm was no more than 5 miles west of the field, probably closer, as they reached the outer marker. They were also aware the thunderstorm was affecting the wind conditions at the field. Given this information, the board felt the crew should have been aware they would enter thunderstorm-related weather conditions if they continued the ILS approach to runway 21R and therefore, the captain's decision to continue was inappropriate.

Cockpit management—A lack of preparation and anticipation characterized the flightcrew's management of the final portion of the flight. While the crew did accomplish all required actions, they didn't discuss the special situation they were in. The crew made no requests for any of the following: weather updates, (despite obvious discrepancies between reality and the ATIS); clarification of the wind data provided, (despite confusion as to its significance by both pilots); or clarification of the location

Echo intensity		Rainfall rate (in/hr)	Indication
1	weak	.2 (light)	Light to moderate turbulence
2	moderate	.2-1.1 (moderate)	is possible with lightning.
3	strong	1.1-2.2 (heavy)	Severe turbulence possible, lightning.
4	very strong	2.2-4.5 (very heavy)	Severe turbulence likely, lightning.
5	intense	4.5-7.1 (intense)	Severe turbulence, lightning, organized wind gusts.
6	extreme	7.1 (extreme)	Severe turbulence, large hail, lightning, extensive wind gusts and turbulence.

VIP Levels - RWS radar systems are able to objectively determine radar weather echo intensity by the use of Video Integrator Processor equipment.

of a known thunderstorm, (despite its obvious proximity).

Further indications of the flight-crew's unprepared state included flying the airplane into the center of a thunderstorm; lack of anticipation of thunderstorm-related weather; and lack of recognition of these phenomena at onset. The result of this lack of preparation was confusion in the cockpit—the decision-making process broke down. The captain's belief that he was being "pushed down" was actually a decrease in airspeed, not a loss of altitude. His perception of imminent ground contact was overwhelming and went unchallenged, despite the fact the aircraft instruments worked properly and were available to both pilots. The pilot's decision to land was based on his "seat of the pants" interpretation of the events, not the actual situation.

The safety board also pointed out the first officer failed to support the captain, save mandatory checklist items, nor did he provide any information. In fact, he did not question the information he had, even though he was unsure of its significance. The safety board felt the first officer should have been more aggressive in resolving his concerns about the existing conditions, and should have voiced his concerns to the pilot. His uncertainties should have led him to discussing the feasibility of abandoning the approach. In this mishap, the NTSB saw little indication of leadership from the captain, nor any crew augmentation from the copilot. This mishap clearly highlights the necessity for aircrew assertiveness and coordination training—e.g. cockpit information management training. The NTSB feels training in crew coordination and decision making should be required for *all* crewmembers as these skills are essential for the safe operation of aircraft.

Conclusions

The NTSB had 27 findings in this mishap, the following 12 are the most directly related to the causal sequence:

1. A VIP level 4 thunderstorm passed over the northern portion of the airport and the threshold of runway 21R as Flight 183 approached decision height.
2. The flightcrew had sufficient information upon which to make a decision to start a missed approach before entering the thunderstorm.
4. The airplane was flown into the thunderstorm before a missed approach was started, and the missed approach was initiated as the airplane passed through the center of the rain and hail shaft.
5. The airplane's rate of descent was stopped by the initiation of the missed approach, and the airplane was flown at a constant altitude for about 16 seconds.
6. The airplane was capable of maintaining level flight during the missed approach.
7. The captain's belief that the airplane would not climb was influenced by the incorrect perception of information, and the physical consequences of entering the thunderstorm cell, i.e., the rain, hail and effect on the airplane's pitch attitude.
8. The captain elected to land the airplane when he saw the runway, although the airplane may have been capable of continued safe flight.
9. There was inadequate crew coordination and management during the instrument approach and missed approach.
10. The first officer failed to assist the captain to the fullest extent possible under the circumstances by not voicing his uncertainty about airport weather conditions.

Probable Cause

The National Transportation Safety Board determined the probable cause of the accident was inadequate cockpit coordination and management which resulted in the captain's inappropriate decision to continue the instrument approach into known thunderstorm activity where the airplane encountered severe wind shear.

Application To MAC

In the past year and a half, an alarming number of safety investigation boards have concluded crew error was causal. Equally alarming is the realization that often the information missing from the critical, often final, decision was available to the crew. In some cases at least one crewmember had the answer. While mishaps are always tragic, those in which the resources to prevent catastrophy were available and either unrecognized, unused or simply not offered represent an especially intolerable category. We can do something about these simply by exercising sound crew coordination. Just plain talking to one another really works!

Adapted From NTSB/AAR-85-01

Excellence In Airmanship

Left to right: 1st. Lt. Frank Santiago, Jr., copilot; TSgt. William A. Gilbreath, flight engineer; Maj. Alfred E. Stanton, aircraft commander; Sgt. Shannon E. Curry, loadmaster; and Capt. David C. Lee, navigator.

Maj. Alfred Stanton and crew, 316th Tactical Airlift Group, were tasked to fly their C-130E on a low-level training mission originating at Yokota AB, Japan, with a stopover at Taegu AB, Korea. The crew was to offload a drop zone control party, fly three low-level routes to airdrops at Waegwan Drop Zone, then return to Yokota. Although originally scheduled to be part of a three-ship formation, Major Stanton and his crew began the mission single-ship when the other two aircraft developed mechanical problems.

The mission proceeded normally to Taegu, but approximately 40 minutes after departing the Korean base the crew encountered severe aicraft control problems. Operating at 500 feet AGL, Major Stanton initiated a 30° bank right turn. But during the turn, he felt the yoke slip 30° further right with no effect on bank angle. Major Stanton immediately began a climb to clear the surrounding terrain and rolled out of the turn, noting it took very little movement of the yoke to roll wings level. Once in wings-level flight, though, the crew was forced to hold the yoke 90° to the right to maintain that attitude. They also discovered they were unable to turn the aircraft to the right. TSgt. William Gilbreath, flight engineer, and Sgt. Shannon Curry, loadmaster, scanned the wings and reported a fuel leak in the area of the left aileron and that both ailerons were fully up.

Major Stanton immediately began a return to Taegu for landing. While the navigator, Capt. David Lee, provided headings and minimum altitudes to clear terrain, the copilot, 1st Lt. Frank Santiago, Jr., coordinated the emergency return and an opposite-direction approach. Enroute to Taegu, the crew completed a controllability check and prepared for landing. The ensuing recovery was normal until the aircraft approached touchdown, when it began a roll to the left, even with full right aileron applied. Using a combination of rudder and differential power, the pilots were able to level the wings and landed the aircraft without further difficulties. Once stopped, they shut down the engines and performed an emergency ground egress because of a massive fuel leak on the left wing. Post flight investigation revealed the left aileron bellcrank had failed, leaving the left aileron inoperative and tearing a six-inch by three-quarter-inch hole in the number-one main fuel tank.

The accurate and timely response to this critical emergency by Major Stanton and his crew prevented the possible loss of life and destruction of a valuable Air Force aircraft. Their actions clearly qualify them for the Excellence in Airmanship Award. Congratulations from *TMF*.

Hazards of the Profession

by 1LT Stephen J. Robison
1402 MAS, Andrews AFB, MD

The winter sun sliced into the wing commander's office, reaching across the wide room like a sundial's blade. At a walnut desk by the window sat the man whose name appeared on the dozen certificates hanging on the office walls. The colonel sat motionless, as if in a trance, oblivious to the papers on his desk which only moments before had his undivided attention. The resonance of the telephone's bell had long since been muted by the carpet, yet to him, the last note of the phone bell seemed to hang in the air.

Col. Dan Meyer looked at the phone for a minute after returning the receiver to its cradle. In his mind he could already see the events of the next few weeks set into motion by this short telephone message: the investigation, the reports, and the dreaded visits to the victims' families.

Dan knew how many months it had been since the last C-141 Class A mishap; it was a figure which all wing commanders had at their fingertips. "Now it's happened to me," Dan thought, and immediately felt guilty for this selfish reaction. He still knew practically nothing about the crash.

According to command post, the C-141 was on final approach. They were lightweight at the end of a local aircrew proficiency sortie. Although windy, the weather was above the minimum required for the training mission. The tower reported the IP's gear down call had been the last transmission before the crash. Two of the crewmembers got out of the wreckage, but were badly burned. Three bodies were found at the crash site; two were still missing.

"What's happened to the two survivors?" Colonel Meyer had asked the command post duty officer.

"They're enroute to the base hospital now, sir. The emergency room was alerted as part of the crash net, so they're ready for them," was the reply.

Looking at the telephone receiver still beneath his hand, the wing commander's mind drifted back to a bright morning in Da Nang, over 12 years earlier. The details of that distant morning returned as vividly as though he'd just lived through them. . . .

"My God, Dan, have you seen him?" Colonel Burton's voice was coarse, tight with stifled tears. The question hit Capt. Dan Meyer in the gut—hard.

"No, sir. I. . . I just got here. I came right from the flightline. I saw the wreckage. . . didn't even recognize it at first. Is he. . ." Dan paused. How could he ask this question? "Is he very badly burned?"

"Severely! I've never, ever seen anything like this," uttered the DO as he dropped into the leather cushions of the waiting room couch. Dan could hardly believe his eyes. Colonel Burton was a two-time veteran, a WWII bomber pilot and a Korean fighter jock. He was awarded the Purple Heart, a large number of DFCs and campaign medals from three wars. The "Silent One" they called him, "The Rock, Iron Man."

Neither have I, Dan thought. He resisted the urge to place a consoling hand on his superior's shoulder. "I think I'll look in on him now," he said weakly, and left Colonel Burton in the waiting room.

Out in the hall Dan paused, uncertain. He'd come directly from the flightline at the news of his roommate's crash, and had been in the hospital for nearly three hours. Looking to his left he could see the swinging plywood doors marked "Burn Ward." His

2nd Place Winner 1985 Flight Safety Writing Contest

friend and roomate lay just beyond those doors. He pictured Jerry's thin, scorched body, IV tubes strung like a maze of umbilicals about his bed. He would be attended by business-like nurses, their mouths and noses covered with surgical masks.

Half a dozen times Dan had come out of the waiting room and estimated the distance to the burn ward. Ten, fifteen seconds march at a regular cadence, he guessed. Maybe thirty seconds if he shuffled. He was good at that. It was a knack. At Officer Training School Dan had been little short of legendary at estimating distances by the seconds it took to march. As an officer trainee, he could march his flight to the mess hall for chow and snap a salute to the mess checker just as the second hand passed through 12 on his flight's appointed minute. But in the last three hours, the 15-second walk to the burn ward was a trip Dan was unable to make, even though he'd started it half a dozen times. Each time, gripped by a wrenching in his gut, he'd turned back into the empty waiting room behind him.

"Excuse me, Captain."

Dan turned around. He blocked the path of a nurse pushing a green linen cart. She was tired. Her red hair hung limp from the summer heat. Dan noticed how busy the Da Nang hospital was, even at eight in the morning. She's busy enough, without some pilot blocking her path, Dan thought to himself. "Oh, I'm sorry," he blurted out. "I was just. . . Say, is there a latrine anywhere near here?"

"Down there, to the left, just past the nurses station." The nurse didn't look at him as she passed.

In the latrine, Dan let the water run for a long time. Looking up, he saw his wet, unshaven face in the mirror. It seemed like the face of a man older than Dan's 29 years. His dark hair was matted to his head, eyes reddened from fatigue and the strain of late night missions. His nomex flight suit was cool in the air conditioned hospital.

"Uh, Captain?"

"Yeah?" The hospital corpsman was immaculate in his pressed whites.

"You're here to see Captain Hooper, aren't you sir?"

"Yes, I was. Is he very. . . ."

"Look Captain, the nurses asked me to come in and talk to you. You've been here since five this morning. Captain Hooper is stabilized, but he needs a lot of rest. Everybody's doing everything they can for him. Why don't you go home and get some chow or some sleep or something? You can't do anything here."

Dan avoided the young medic's eyes as he dried his hands on the coarse paper towels. "Okay, Sergeant," Dan said quietly, "if you think that's best."

"I've called a crew bus for you, Captain. Why don't you give us a call tomorrow."

"Thanks." Dan left the hospital without ever going in to see his injured friend. He felt like a deserter, slinking out of the hospital into the hot morning.

The next day Colonel Burton stopped Dan outside the squadron building on the flightline. They were going to the briefing room to prepare for the night's interdiction mission in the blackened AC-119 gunships. The colonel was himself again, the Iron Man, calm and in control.

"Dan, I've talked to the other men on Jerry's crew. Nguyen, the pilot Jerry was checking out, was one of the best. Did you know that after he got safely out, Nguyen went back into the plane with a fire extinguisher to get Jerry out?"

"What the hell happened, sir?" Dan could just make out the form of the gunship's wreckage at midfield. The only recognizable part of the plane was the twin-boomed tail, resting where it crashed on landing, now covered with black and white foam.

"Well, we don't know the specifics yet. It looks as if it might have been flight control damage. The gunners said they took some hits from ground fire and were coming back heavy."

"He's going to be all right, isn't he?" Dan felt the same kick in the gut he felt in the hospital. "I mean, they said he'd be evacuated to the states as soon as. . . ."

"He didn't make it through the night, Dan."

"What?"

"I just spoke to them at the hospital. He died on the night shift."

"Oh."

"Look, I've been around long enough to know there's nothing I can say that'll help, Dan, but I've been thinking about it all day. Listen, Jerry knew what he was doing. He

was a good pilot; he was a good IP. This crash was an occupational risk. It could have happened to any of us." The colonel's voice gradually assumed its usual curt quality as he talked. "He was flying because it's what he believed in. This is what he wanted to be doing. Flying is a risky business, not only in wartime, but intrinsically. It's just easy to forget that sometimes. We just don't come face to face with those risks very often. We all strive to do our best, to be the best pilots in the world, but there are risks—what shall I call them, professional hazards—we have to live with, to overcome."

"Sure, colonel," Dan could only half hear the colonel's speech.

"Usually when you lose someone in this business, you never see the results. They get scratched off the schedule, their goods get shipped home. It's like a PCS, you know? I've never had to face one of my men in a hospital, Dan. This was the first time I'd ever seen the danger of flying up close, I mean face to face. It's a hard way to relearn a lesson.

In his spacious office, thousands of miles and a dozen years away from that crash, Colonel Dan Meyer remembered how empty his superior's words had sounded on the gunship flightline, what little comfort the colonel's generalities about flying and its dangers had been.

"Colonel Meyer? Have you heard about the crash?" Dan looked up as one of the wing safety officers, Capt. Jim Fletcher, entered the office.

"I just got off the phone with command post," he said.

"I've got a truck out front, sir. Do you want to go to the crash scene?"

Meyer looked at the faded photo beneath his plexiglass desk top—two captains in their bulky flying kits squinting into the camera, the shadow of a protuding minigun barrel slanting down the side of the dark aircraft behind them.

"No, Fletcher," Colonel Meyer said. "Take me to the hospital."

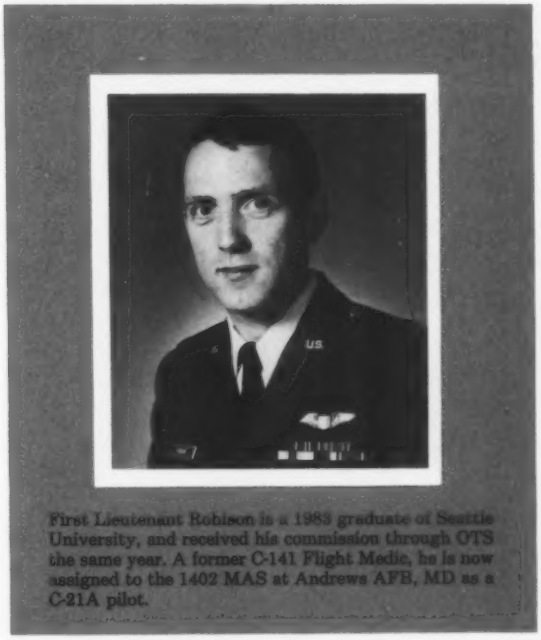
On the way to the emergency room Captain Fletcher went over what little information was available on the airplane and its aircrew. He gave a quick summary of the aircrew's currency, but could add little to what Meyer already knew.

In the hospital parking lot, Colonel Meyer delayed opening the pickup door. Looking straight ahead through the windscreen, he pictured the clean hospital corridors, the busy emergency teams, the polite nurses. His safety officer stole a sidewise glance as he parked the truck. With one hand Meyer picked up the black brick with its rubber covered antenna and placed his other on the truck's door handle. His voice was quiet as he heard himself repeating his old DO's words.

"This crash was an occupational risk, Fletcher. It could have happened to any of us," he said. "Flying is a risky business, not only in wartime, but intrinsically. It's just easy to forget that sometimes. We just don't come face to face with those risks very often."

"Yes, sir," the safety officer managed a half smile of encouragement as the colonel stepped out of the pickup and closed the door.

To himself Dan confessed, "I don't think I've ever squarely faced the real risks of this profession. I suppose I've tried for a dozen years to put them out of my mind," he whispered. As he started to walk towards the emergency room he estimated the distance to the door—ten, maybe fifteen seconds at a regular cadence. . . .



First Lieutenant Robison is a 1983 graduate of Seattle University, and received his commission through OTS the same year. A former C-141 Flight Medic, he is now assigned to the 1402 MAS at Andrews AFB, MD as a C-21A pilot.

Lifties Revisited

Do you know what you knew?

Any initial flight training course worth its salt has to include a discussion on the theory of how an aircraft wing creates lift. Understanding how lift is created is also essential to understanding how a wing stalls. Unfortunately, once the ground training is over and the student becomes proficient in recognizing a stall, this basic flight maneuver is sometimes subjugated to such topics as meteorology, navigation and regulations, not necessarily in that order. Once in a while, however, it's wise to step back and review the basics, especially when the subject is one so near to our collective welfare. A quick and dirty look at wing design and factors which affect lift and stalls might be just the thing to clear out a few cobwebs. So stimulate those atrophied brain cells for a moment and see if what you know is indeed what you thought you knew.

Wing Design

In the early 1700s, Daniel Bernoulli published a paper in which he explained the effects of fluid motion on pressure. This theory, the basis for the creation of "lifties" by a wing, states that as the velocity of a fluid through a tube increases, the pressure against the inside walls of the tube decreases. Aerodynamically, this was a key factor in the development of the airfoil. The next step in the evolution came with the development of the *venturi tube* (Figure 1). This tube confirmed Bernoulli's theory that as a fluid passes through the narrow portion of the tube, it accelerates, reducing pressure against the side walls. If you mentally remove the top half of the venturi tube you'll note the fluid air must still accelerate around the top of the remaining portion. This creates a pressure differential between the top and the bottom of what now becomes the airfoil (Figure 2). Reduced atmospheric pressure on the top of the wing results in lift.

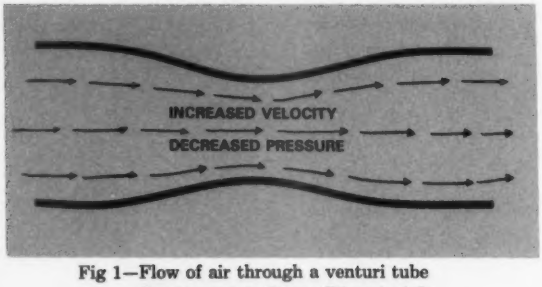


Fig 1—Flow of air through a venturi tube demonstrating Bernoulli's principle.

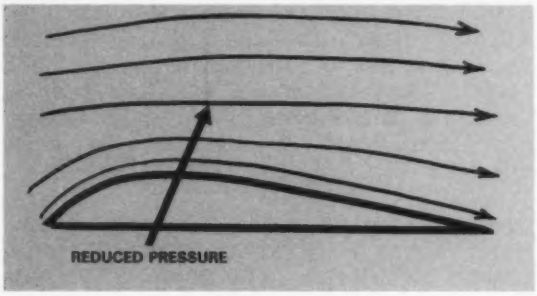


Fig 2—Comparing venturi tube with an airfoil.

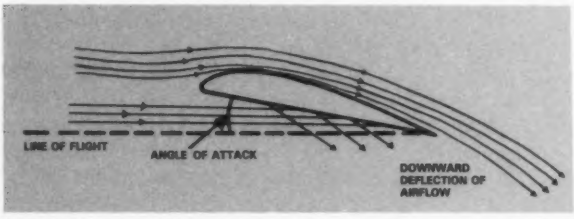


Fig 3—Air being deflected downward as it passes over top of wing.

There's one final factor that contributes to lift production, and it's defined by Newton's third law of motion. As you may recall, every action evokes an equal and opposite reaction. As a wing moves through the air, air is deflected downward behind the trailing edge of the wing (Figure 3). As this air is thrown downward, the equal and opposite reaction is an upward movement of the wing. The faster the wing moves through the air, the greater the mass of air and the more force with which the air is deflected downward, and therefore the greater the lift

created. But the shape and size of the wing is also important.

Wing area is measured in square feet and a wing with 200 square feet will lift twice as much as a wing of only 100 square feet providing, of course, that speed, angle of attack and design are the same. A long, narrow wing will normally lift more than a short wide wing of the same square footage. This is due in part to the reduced drag found with the long slender wing. The relationship of a wing's width to its length is called *aspect ratio.* The average aspect ratio of an aircraft wing is around 6:1, but a glider wing may have a ratio as high as 20:1. While greater lift is created by the long slender wing, there is a drawback. A long wing must be stressed to resist more bending and twisting forces than shorter wings. This results in a heavier long wing in comparison with its short, rectangular counterpart with the same wing area.

Angle of Attack

During straight-and-level flight, *the chord line* (an imaginary line running from the wing leading edge to the trailing edge) is nearly parallel to the relative flow of air. There's very little impact pressure on the wing's lower surface. Almost all of the lift is due to the pressure differential created by the top half of the wing. Figure 4 shows the relationship of relative wind and the chord line. The angle formed by the chord line and the relative wind is the *angle of attack.* With a 5° angle of attack, the bottom surface of the wing contributes about 25 percent of the total lift. At 10° the percentage jumps to about 30 percent. In order to maintain level flight at slow speeds, the angle of attack must be increased. During flight, there are pressure forces in action on every portion of the wing's surface. These forces vary in magnitude and direction from forces acting on other areas ahead of and behind the wing. These forces may be summed to yield a total magnitude and direction. The point where this *resultant force* intersects the chord of the wing is termed the *center of pressure (cp),* shown in Figure 4. At higher speeds, air travels faster around the airfoil and creates a greater pressure differential. This requires a lower angle of attack to maintain level flight. An aircraft traveling at 100 knots can support four times as much weight as the same aircraft traveling at 50 knots, providing the angle of attack remains constant.

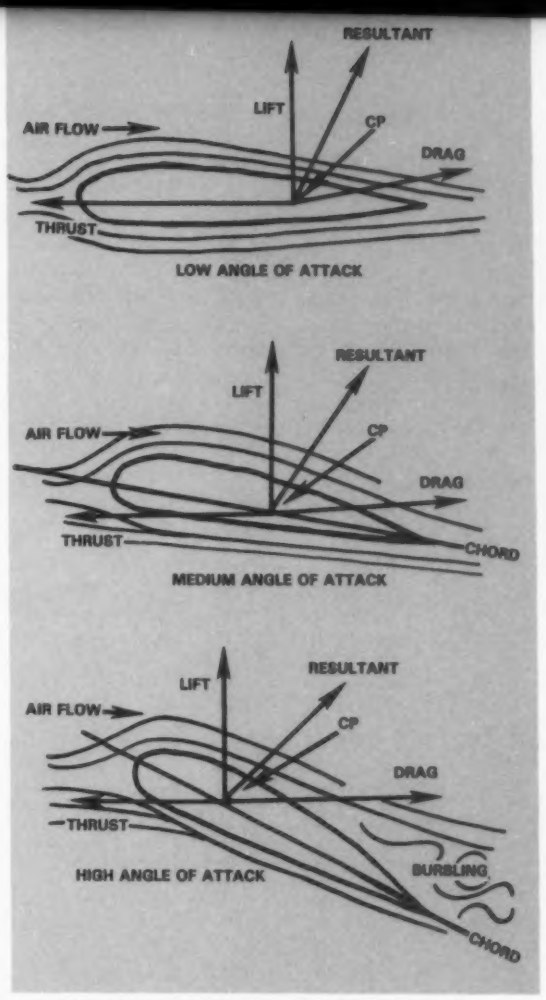


Fig 4—Change in resultant with angle of attack.

The higher we climb, the fewer molecules of "air" there are per cubic foot. Since there are fewer molecules moving across the wing's surface, the amount of lift created at higher altitudes is less. To compensate, the aircraft must travel faster at higher altitudes. At higher altitudes, there is less resistance presented to the moving aircraft, again due to less dense "air." High altitude, high temperature and high humidity *all* result in fewer air molecules and, therefore, result in less lift across the wing for a given speed and angle of attack.

The Stall

An aircraft can be stalled at *any airspeed, any altitude, and at any attitude.* Remember, the stall is caused by exceeding the critical

angle of attack (i.e., the angle at which, for a given aircraft configuration and condition, the aircraft will stall), not by flying too slow. An aircraft operating in straight-and-level undisturbed flight requires a low angle of attack and the air flow over its wings is relatively smooth. In rough, turbulent air, however, this angle of attack will momentarily deviate resulting in a small increase in the amount of turbulence at the trailing edge. These minor deviations are easily corrected by the pilot and the natural stability of the aircraft itself will tend to return it to straight-and-level flight.

As already mentioned, *all* stalls are caused by exceeding the critical angle of attack. However, knowledge of this fact doesn't necessarily help the pilot. What's more important to a pilot is understanding what factors are likely to cause the aircraft to exceed that critical angle of attack. A

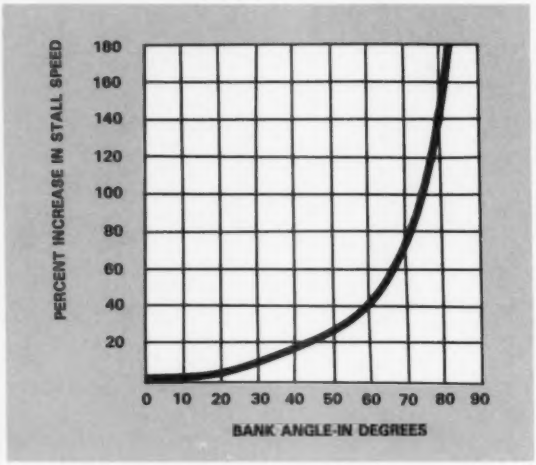


Fig 5—Stall Speed Chart.

pilot may enter a high speed stall anytime he or she applies *abrupt or excessive back pressure* to the flight controls, regardless of airspeed.

Several factors have a direct impact on aircraft stall speed:

- As aircraft weight increases, the stall speed likewise increases. A higher weight requires a subsequent higher angle of attack or speed to produce additional lift. Therefore, the critical angle of attack is reached at a higher airspeed.
- The farther forward the center of gravity, the higher the stall speed. An aft CG, however, may present stability problems which far outweigh any advantage obtained by the lower stall speed.
- Turbulence can cause a large increase in stalling speed. An upward vertical gust causes an abrupt change in relative wind, leading to an abrupt increase in angle of attack which results in a stall.
- As indicated in Figure 5, as bank angle increases, both the angle of attack needed to maintain level flight and the stall speed increase. At 60 degrees of bank, stall speed is 40 percent greater than in straight-and-level flight.
- Flaps and/or slats change the camber of the wing and therefore change the stall speed. Keep this in mind when flying no-flap approaches.
- A light accumulation of frost, snow or ice on the wing may cause a significant increase in stall speed by changing the shape of the wing.

Should your aircraft enter a stall, here is the standard recovery procedure:

- **Decrease the wing's angle of attack.** This reestablishes a smooth, undisturbed flow of air across the wing. Exceeding the critical angle of attack got you into the stall in the first place and decreasing it will help you recover.
- **Add power.** This will increase the volume of air flowing over the wings as airspeed increases.
- **Level the wings.** As noted, bank angle increases the speed at which a wing stalls so it's essential to return the wings to level flight.
- **Stop the descent.** Be cautious while applying back pressure during the recovery to avoid entering a secondary or accelerated stall.

(Editor's Note:—For a more detailed look at stall recovery, consult your aircraft's Dash-One.)

In today's high-tech cockpit, it's easy to get sidetracked from the basics of flight. Understanding how the aircraft wing creates lift is among the most basic of lessons. However, once we complete initial training, it's often assumed pilots retain a full understanding of these basics. An easy lesson reviewed on the ground may prevent a hard lesson learned in the air.

VOLANT RODEO '85

by Capt Byron L. Howard
Associate Editor

June means something different to everyone—swimming, suntans, vacations, etc. But if you're an airdrop qualified crewmember, a combat controller, maintenance person, security police, or aerial porter, June has one all-encompassing reason for being—Volant Rodeo! It's where the "best of the best" meet every year to see who gets to brag loudest for the next 365 days. The seventh iteration of MAC's annual tactical airdrop competition was held under and over the loblolly pines of Pope AFB, North Carolina, as were the previous six.

This year over 30 aircraft and approximately 1,200 people from all over the world converged on MAC's "airlift central" for the contest. Included in this year's competition were teams from Australia, Brazil, Canada, Italy, Portugal, and West Germany. The 374 TAW, Clark AB, RP represented MAC's Pacific force and teams from the 435 TAW and 7 SOS flew in from Rhein-Main AB Germany. Alaska was well represented by teams from both the active duty unit, the 616 MAG from Elmendorf, and the Air National Guard unit, the 176 TAG from Kulis. Mildenhall sent their aerial porters from the 5 MAPS. Kirtland, Bolling, Dover, Scott, Andrews, and Lajes also sent teams for the security police competition. Other units came from the Air National Guard, Air Force Reserve and other MAC units. So, who won what?

Macho Men

Although the flight competition takes the most manpower, time, and effort, the combat controllers seem to have a unanimously acclaimed monopoly on the most grueling of all the events. Each of the five events the CCT'ers compete in is tough, but one in particular is the toughest by far—the six-mile run! By their own admission, this is the one event in which the winner has only himself to beat. It is a purely "macho" event. Six miles is tough enough, too, but add in several pounds of combat boots, a *40-pound* rucksack, and the infamous North Carolina heat and humidity, and the run becomes a test of mind and muscle over pain—lots of the latter. But someone always has the will to win. This year a young combat controller from McChord's 62 MAW, SrA. Manuel Marquez, finished first. Not only was he first to finish (47 minutes, 16 seconds), he was just a mere three seconds off the best time ever! The rest of McChord's CCT'ers weren't far behind either, finishing fourth and eighth. Second place in the six-mile run went to the Italians. McChord went on to an overwhelming victory in the CCT competition beating Italy, the second place team, by 240 points.

Maintenance

This is always a tough contest. Without exception, all of the planes looked as though they were spit polished, attesting to the endless hours of work lavished on the machines by the maintenance technicians. The airplanes were just plain bee-u-tee-ful, each one a credit to the crew chiefs and other maintenance professionals.

But every year, this competition also seems to get stiffer. Last year we called the judges "persnickety." This year, if anything, they were more so. All it took was one miscue by a maintenance troop and, as Don Meredith would sing, "turn out the lights, the party's over." In the final analysis, only *four and a half points* separated the top four teams. The 133 TAW finished first with 1,698.5 points, or just 1½ points from a perfect 1,700. The Australians came in second with a score of 1,697, with the West

Germans and the Portuguese rounding out the top four. But that was the C-130 maintenance competition. The C-141 competition was keener yet, at least in determining the top two teams. Just a half point separated the 443 MAW with 1,667, and the 446 MAW with 1,666.5 points. The 63 MAW finished third.

Joint Inspection

The joint inspection event pits the best riggers in the business against the sharpest test of their technical and procedural knowledge. They must find every single anomaly in an "officially sabotaged" load, or points are deducted. This year's event proved tougher than ever as the repeating champs from the 463 TAW, Dyess AFB, found themselves in a tie for first place with the 317 TAW from Pope. In the end, the 317 TAW

prevailed, breaking a 195-point deadlock in overtime to take first place.

Security Police

Along with shooting each other with lasers, the security police portion of the competition entails combat patrol and setting up defensive perimeters, all in a race with the clock. This year, West Germany beat out the 438 MAW to take first-place honors.

Shortfield Landings

"It takes total concentration to make a successful assault landing." That's how Maj. Chuck Burch, aircraft commander on the 94 TAW crew from Dobbins AFB, Georgia, described the effort it takes to make an assault landing. Volant Rodeo aircrews also faced a new change in the shortfield landing rules this year. In the past, the object was to land as close to the 100-foot distance marker as possible. This often led to some rather rough landings and poor techniques. This year, however, the pilots were graded not only on how close they came to the marker, but whether or not they bounced when they hit. A "bouncer" cost the team valuable points in the event. Accuracy counted, but smooth technique and following proper procedures counted, too. Top teams in the shortfield landing event, based on one dirt and two paved assault strip landings, were the 459 TAW from Andrews; the 113 TAW represented by Martinsburg, West Virginia; and the Australians.

Engines-Running On- and Off-Load—ERO

Perhaps no other single event at Volant Rodeo is more closely watched for safety violations than the ERO. The time factors, added with whirling propellers and large amounts of adrenalin, combine for an "extra

risk operation." Still, those who load two trailers and a truck the quickest and safest are the winners. The Australians won the C-130 ERO contest, followed closely by the 146 TAW. In the C-141 ERO contest, the 446 MAW from McChord finished first, followed by the 437 MAW from Charleston.

Allied Teams

This year, as always, the Allied teams came to Volant Rodeo to give their American hosts a run for their money—and for each other's money as well. Besides being eligible for all the main events—aircrew, maintenance, ERO, etc.—the Allies also had stiff competition among themselves for "Best Allied Team" trophy. When the last plane had landed, the Australians had clearly won based on sterling performances in all the main scoring categories. Second place went to the Canadians, and third went to the Portuguese who, by the way, were making their first appearance at Volant Rodeo.

The Best of the Best

The "Best Wing" at each year's airdrop competition is determined by the combined totals of all the airdrops—heavy equipment, personnel and CDS—and the maintenance total score. With a possible score of 7,040 points, the 94 TAW from Dobbins AFB, Georgia—the first Reserve unit to win the "Best Wing" trophy—accumulated 6,229 points on their way to victory. Looking back a little farther, though, the Georgia reserve unit had won several other events during their seven years of competition. In 1979, when the 94th was flying C-7 Caribous, they won the "Best C-7 Aircrew" and "Best C-7 Maintenance" trophies. In 1981, they had the "Best STOL Maintenance." So, as you can see, they've always been tough competitors. Maybe it's something in the Georgia red clay.

Coming in just 32 points behind were the "regulars" from the host unit, the 317 TAW, Pope AFB. Third was another Reserve unit, the 315 MAW from Charleston. Air Force Reserve and Air National Guard units won four other major competition events during this year's Volant Rodeo.

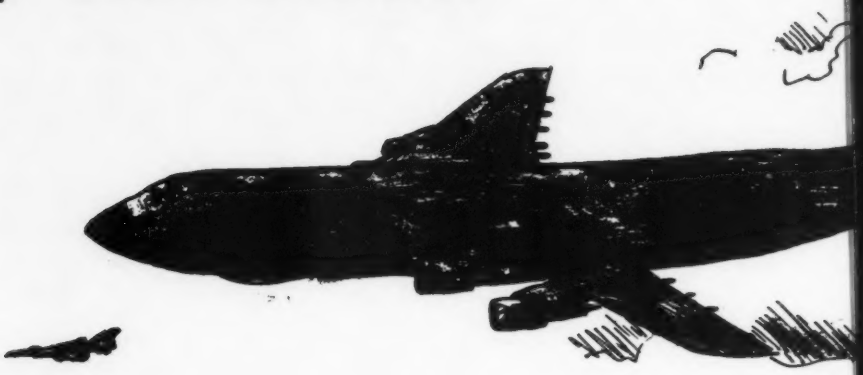
"We've heard a lot about the 'total force' concept in the Air Force in the past 15 years," said Brig. Gen. Larry Wright, 22d Air Force vice commander and this year's Volant Rodeo commander. "I think that with the standings in Volant Rodeo this year, we have finally achieved total force reality."

Every year, Volant Rodeo changes for the better. The judges get pickier (for the better), the rules challenge the participants more, and another Allied team shows up which hadn't participated before. This year, in fact, the Marines sent observers to see what all the hoopla was about, and General Wright speculated about their participation in next year's Volant Rodeo. "I figure they (the Marines) will jump in next year," he said, adding that the Marines would be welcomed participants in Volant Rodeo '86. Marines at Volant Rodeo, huh? It ought to get even *more* interesting, now!

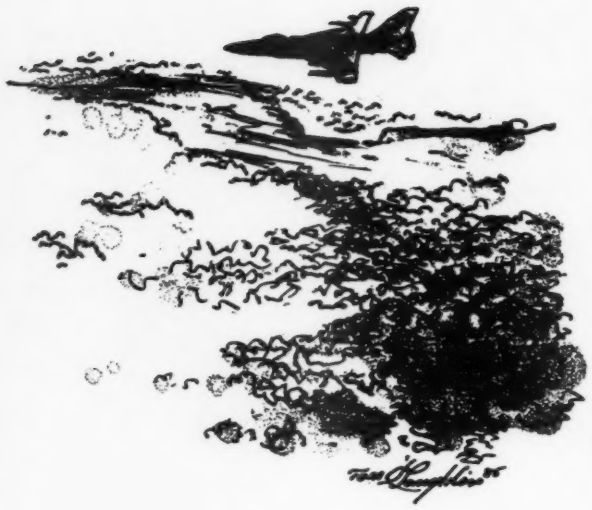
The Winners

Best Wing	94 TAW (AFRES), Dobbins AFB,Ga.
Best C-130 Aircrew	435 TAW, Rhein-Main AB, Germany
Best C-141 Aircrew	315 MAW (Assoc), Charleston AFB, S.C.
Best C-130 Maintenance	133 TAW (ANG), Martinsburg, W. Va.
Best C-141 Maintenance	443 MAW, Altus AFB, Ok.
Best C-130 ERO	Australia
Best C-141 ERO	446 MAW (Assoc), McChord AFB, Wa.
Best Shortfield Landing	459 TAW (AFRES), Andrews AFB, Md.
Best Combat Control Team	62 MAW, McChord AFB, Wa.
Best Security Police	West Germany
Best Aerial Delivery (JI)	317 TAW, Pope AFB, N.C.
Best Allied Team	Australia

Interception Procedures by the Book



by Jan W. Steenblik



(Editor's Note: Displaying the American flag is something in which we all take pride. As the man said a long time ago, "My country—may she always be right. But my country—right or wrong." Today, as crewmembers, we carry that flag and display it proudly, whether it is on the flight suits we wear or on the airplanes we fly. And because we carry it to some pretty distant and out-of-the-way places, the threat of becoming involved in an international incident is especially great for MAC-types, whether in the air or on the ground. Because of that, we must stay aware of the threat around us at all times, and especially in the air.)

The annihilation of Korean Air Lines Flight 007 by a Soviet interceptor in September 1983 brought the grim realities of global politics into the cockpits once again. Civilian aircraft, scheduled airline flights and even military airlift transports may be intercepted by armed military aircraft whenever they pass near, or stray into, the airspace of hostile nations, or when their flight into the airspace of a friendly (even their own) nation is not properly coordinated

with air traffic control authorities. The inescapable conclusion that the Soviets broke international rules for intercepting civilian aircraft—and two other cases of interceptors shooting down airliners within the past 11 years—appears to be a cold-blooded mockery of these peaceful procedures. Pilots of international flights especially should know these signals and procedures by heart because the lives of everyone on board may depend on establishing unambiguous communications with interceptor pilots and complying with their wishes promptly. Here is a review for everyone else.

Some 121 member nations—including the Soviet Union—make up the International Civil Aviation Organization (ICAO), the Montreal-based aviation branch of the United Nations. All these nations are signatories to ICAO Annex 2 ("International Standards—Rules of the Air"), including Attachment A to Annex 2, "Interception of Civil Aircraft." This document, dated December 30, 1976, outlines a three-phase procedure for interceptors to use in *identifying* civil aircraft.

In Phase I, the interceptor(s) approach the intercepted aircraft from the rear; the element leader or solo interceptor normally moves to a position to the left of the intercepted aircraft, at the same altitude, but not forward of the wing, and not closer than 1,000 feet horizontally. Other interceptors are advised to stay well clear of the intercepted aircraft, preferably above and behind.

Phase II calls for the element leader or single interceptor to begin "closing in gently" on the intercepted aircraft, at the same level, until no closer than absolutely necessary to establish indentification. The ICAO rules urge the interceptor(s) to "use caution to avoid startling the flight crew or passengers of the intercepted aircraft."

After the interceptor(s) have positively identified the aircraft, Phase III requires the element leader or solo interceptor to "break gently away" from the intercepted aircraft in a shallow dive. Other participating interceptors remain well clear of the intercepted aircraft and rejoin the leader.

Then, and *only* "if, following the identification maneuvers in Phases I and II above, it is considered necessary to intervene in the navigation of the intercepted aircraft, the element leader, or the single intercepting aircraft, should normally take up a position slightly forward of, and on the left (port) side of the intercepted aircraft, to enable the pilot-in-command of the latter aircraft to see the visual signals given." The visual signals and procedures for communication between interceptor and intercepted aircraft published in the U.S Airman's Information Manual (AIM) are identical to the ICAO procedures. A later paragraph in ICAO Annex 2, Attachment A, states in plain English that *"intercepting aircraft should refrain from the use of weapons in all cases of interception of civil aircraft."* (Emphasis added).

(Editor's Note: We've also reprinted the pertinent parts of the DOD Flight Information Handbook so you can take a closer look at the interception procedures found on the back cover, inside back cover and last page. All this information, taken together, should give you a better handle on what to do *if* you're ever intercepted.)

Courtesy Airline pilot

SIGNALS INITIATED BY INTERCEPTI
INTERCEPTED

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	**DAY**—Rocking wings from a position in front and, normally to the left of intercepted aircraft and, after acknowledgement, a slow level turn, normally to the left, on to the desired heading. **NIGHT**—Same, and in addition, flashing navigational lights at irregular intervals. **NOTE 1**—Meteorological conditions or terrain may require the intercepting aircraft to take up a position in front and to the right of the intercepted aircraft and to make the subsequent turn to the right. **NOTE 2**—If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race—track patterns and to rock its wings each time it passes the intercepted aircraft.	You have been intercepted. Follow me	**AIRPLANES:** Day—Rocking wings and following **NIGHT**—Same, and in addition, flashing navigational lights at irregular intervals. **HELICOPTERS:** **DAY or NIGHT**—Rocking aircraft, flashing navigational lights at irregular intervals and following. **NOTE**—Additional action required to be taken by intercepted aircraft is prescribed in **"NOTE TO INTERCEPTION SIGNALS."**	Understood, will comply
2	**DAY or NIGHT**—An abrupt breakaway maneuver from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	**AIRPLANES:** **DAY or NIGHT**—Rocking wings. **HELICOPTERS:** **DAY or NIGHT**—Same as the Series 1 Helicopter signal.	You may proceed.
3	**DAY**—Circling airport, lowering landing gear and overflying runway in direction of landing or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. **NIGHT**—Same, and in addition, showing steady landing lights.	Land at this airport	**AIRPLANES:** **DAY**—Lowering landing gear, following the intercepting aircraft and, if after overflying the runway landing is considered safe, proceeding to land. **NIGHT**—Same, and in addition, showing steady landing lights (if carried). **HELICOPTERS:** **DAY or NIGHT**—Following the intercepting aircraft and proceeding to land, showing a steady landing light (if carried).	Understood, will comply.

EPTING AIRCRAFT AND RESPONSES BY PTED AIRCRAFT

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
4	**AIRPLANES:** **DAY**—Raising landing gear while passing over landing runway at a height exceeding 300m (1000 ft) but not exceeding 600m (2000 ft) above the airport level, and continuing to circle the airport. **NIGHT**—Flashing landing lights while passing over landing runway at a height exceeding 300m (1000 ft) but not exceeding 600m (2000 ft) above the airport level, and continuing to circle the airport. If unable to flash landing lights, flash any other lights available.	Airport You have designated is inadequate	**DAY or NIGHT**—If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate airport, the intercepting aircraft raises its landing gear and uses the Series 1 signals prescribed for intercepting aircraft. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, follow me. Understood, you may proceed.
5	**AIRPLANES:** **DAY or NIGHT**—Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply	**DAY or NIGHT**—Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	**AIRPLANES:** **DAY or NIGHT**—Irregular flashing of all available lights. **HELICOPTERS:** **DAY or NIGHT**—Irregular flashing of all available lights.	In distress	**DAY or NIGHT**—Use Series 2 signals prescribed for intercepting aircraft.	Understood

(ICAO ANNEX 2, RULES OF THE AIR, NOV 81)

NOTE TO INTERCEPTION SIGNALS

1. An aircraft which is intercepted by another aircraft shall immediately:

a. follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals;

b. notify, if possible, the appropriate air traffic services unit;

c. attempt to establish radio communication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 243.0 MHz and repeating this call on the emergency frequency 121.5 MHz, if practicable, giving the identity and position of the aircraft and the nature of the flight;

d. if equipped with SSR transponder select Mode 3/A Code 7700, unless otherwise instructed by the appropriate air traffic services unit.

2. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

C.R. Terror

The Ace of Aviation Enters an Aerobic Program

Criminently, Sammy! There must be some mistake. This list has *my* name on it!"

"You're right again, Boss." Sammy attempted to nurture the Palpitating Pilot back to reality.

"But this is a list of people for the Volant Shape program! I never volunteered for this! Why would I be concerned? I'm already so dashing I'm required to phone ahead to locations with more than 100 single women on the grounds and warn them of my arrival, whether I'm alone or not!"

"Right, Boss, but don't you remember? You decided you were going to demonstrate the Terrorific Tricep, Lat, Pec, and Bicep Buildup process for the rest of us," Ty added.

"Uh, right you are, Ty m'lad. Er, just when was that, exactly?"

"Why just last night, sir. Right after your third 'tini," Sammy answered, trying not to speak too loudly.

"Fourth," corrected Max.

"Oh yes, of course, I knew that," answered the Bombastic Birdman, trying gamely to wade through the fog back to last evening. Mentally mired in a martini daze, the Magnificent Major seemed to have overcome his normal primal instincts, which prevent physical effort of any kind, thereby preserving his usual prima donna condition. As he saw it, his own handwriting had virtually assured his demise.

"Well, gents," their quick-thinking leader began, "I've decided you all don't look in *that* bad a condition, and so I shall spare you the mental and physical anguish of trying to keep up with me. Besides, physical fitness and conditioning take a great deal of time, you know. It must be a long-term, honest effort at cardiovascular commitment. So, I'll just remove my name from this list . . ."

"Why don't you ops check that zipper, Major?" Col. Egdoh veritably oozed professionalism as he chastised C.R. for leaving his flight suit zipper open to the navel, but then, he always did. C.R., of course, nearly swooned at the sound of the colonel's voice, who was, after all, *Mr.* Volant Shape—from HQ! "And while you're trying to improve your 'image,' I think you might want to blouse that belly before you show up tonight."

"Tonight, sir? What's going on tonight?" The Sultan of Society subconsciously began running a check of possible events he may have temporarily overlooked, as well as the much shorter list of possible female companions. "I must have . . ."

"I doubt it, Major. When the duty officer called your squadron commander, under the 'significant/possibly catastrophic events checklist' to let him know you had signed up for the Volant Shape program, your boss immediately passed the word on to me. So, to capitalize on this historic moment, and to prevent you from weaking out and removing your name

today, we entered you in the computer last night. I personally set up your individualized program, and volunteered to supervise your progress. Although there is normally no supervision required, we wanted to capture this event for posterity."

"Er, uh, what about the rest of my men? We simply must preserve crew integrity, and since this is an individualized program. . . ."

"No problem, Major. If your crew wants to join in your admirable commitment to fitness, they may do so at will."

"Count me in," Sammy cheerfully volunteered.

"Me, too," came the stereo response from Ty and Max, eager to join their hero in a worthwhile cause, and absolutely amazed that he had decided to do this of his own volition.

"That's just great," came the oddly dejected response from the Measly Muscled Major.

"Well then, Terror, why don't you hop up on these scales and we'll get your initial weight for the program. We'll record your weight and measurements at the start so you can monitor your progress in real terms." The Massive Major moved towards the scales, which seemed to back away from him.

"Did someone just whimper?" Colonel Egdoh asked the staring faces around him.

"Uh, maybe you ought to *ease* yourself up on the scales, boss," Sammy commented. "With all of us to follow, we wouldn't want to tax the equipment too much."

"Indeed, Sammy." C.R. brightened, seeing a distant possibility of saving face. "You and Blinky *have* put on a few pounds, so we'll all have to be careful not to upset the delicate balance of the equipment." An audible sigh of relief from somewhere pervaded the room. "Well, better get cracking, lads. I've got items for coordination, things to go, people to do, places to meet . . . or something." C.R. was glowing as he veritably sprang to the door. "See you at the gym at 1700!"

A very somber, anxious group watched the Transformed Titan depart. They never knew *what* to expect when the Moody Major shifted gears in the face of adversity.

"What do you make of that?" Sammy verbalized the group's mutual concern.

"I'm not sure," began Colonel Egdoh, "but if I know the major, this is going to be interesting."

Arriving promptly at 1658, Sammy, Blinky, Ty, Max and Colonel Egdoh were met by an incredible sight.

"What on earth is *that*?" Ty was the first to regain his power of speech.

"Well m'lads, how do I look?"

"Uh, *different*, Boss," Blinky stuttered, staring at the Fledgling Fitness Freak. "What's all that stuff?"

"Why it's all the latest in consumable athletic supplies —a definite necessity. I certainly couldn't begin such a serious endeavor without the appropriate gear. After all, I'm *serious* about shape!"

Colonel Egdoh watched in awe as the Matchless Major inventoried his wares.

"Yep, Blinky, I think I've got it all: glow in the dark velcro markers for visibility; neoprene knee supports; special design 'polar bear' underwear to dissipate heat; a monogrammed 'breathing' outer sweatsuit; shoes to match the terrain with a special pocket for whatever; 'calf massage' socks; lace into the shoes

identiplates inscribed with blood type, age, bank account number and emergency directions for preparing a 'Terrorific 'tini'; designer sweat bands; contoured hand grips in 'pleasing colors'; and, of course, a combination 'pulse checker/pace setter' wristwatch. I'm *really* ready."

Ty looked at his own mismatched shorts, tank top and tennis shoe combination and wondered aloud how he ever managed to survive without the latest in everything.

"Well, Ty m'boy, these things are designed for the truly motivated; those who have opted to indulge in an intensive, complete physical program. Combined with a sustained period of measured, deliberate caloric manipulation . . ."

"Is that a diet?" Sammy interjected.

"Please! My tender ears," C.R. snapped. "I don't need to do that. Only people with a real problem do *that*."

"That's where you're wrong, Major." It was Colonel Egdoh again. "It's prudent for everyone to watch what they eat and, in your case, how much. There's no reason to get sucked in on the commercialization of health product advertising, which you seem prone to do, anyway. Eating reasonable quantities of good food, combined with proper exercise will ensure a healthy body. Being fit is a critical part of our profession, you know."

"Speaking of that. . . uh, what do we do now?" C.R.'s facade was beginning to crumble as the moment of truth arrived.

"Well, Major, I thought we'd begin with a few stretching and bending movements," Colonel Egdoh picked up quickly on the Marginal Major's aversion to words like exercise, fitness, health, and run. "Then we'll move on to a gentle six-minute jog."

"Oh!" C.R. perked up. "That sounds like an excellent plan, glad I thought of it. Anybody can work for six minutes. No need for you guys to get upset," the Myopic Major addressed his crew.

"Precisely, Terror," Colonel Egdoh continued, "by starting with a self-paced six minute jog, almost anyone can begin an aerobic program. As you progress through a sequential, systematic increase over an extended period of time, you can work up to a 30-minute run four times a week in a surprisingly short period of time. You'll look and feel much better."

"Hear that, Sammy? In a short period of time you may even begin to approach my level of circulatory consonance. C.R. spun about and began a series of untoward gyrations, vaguely resembling calesthenics

"Whoa, Terror, there's more. Following today's little jaunt, we'll be getting together four times a week, preferably during your lunch hours, to repeat the process. After a couple of weeks, we'll move up to 12 minutes and so on."

C.R. was already bathed in sweat from the two repetitions of the side bender he had just finished. "No. . . (huff, puff) need . . . to excite my crew. . . so soon (gasp, wheeze). . . sir. Let's talk. . . about the other plans. . . over a. . . chilled 'tini later."

"Fine, Terror. Now let's get started." With that, the lithe colonel strode off at a casual 7½-minute mile pace, his youthful muscles literally rippling with each step. Looking back at the Quivering King of Idleness, he shouted, "Don't try to keep up, just make sure you don't stop jogging before the whistle!"

The Motile Major began his first few steps with a wary eye. Then, seeing that his feet remained attached, at least as far as he could tell, he began to stretch his stride. Soon he was streaking along at a pace nearly as fast as most men walk, and not panting too hard, either.

Just when he thought the blood vessels along his temples were beginning to leak a bit and he was ready to quit, the blessed whistle sounded.

The Jubilant Juggernaut froze in midstride, not wishing to waste a calorie of energy, especially when he was unsure of what else lay in store. To his amazment, all he could hear was a steady percussive beat, intermingled with an apparent cackling sound.

Looking up, he wiped three gallons of perspiration out of his eyes and there was the entire squadron, cheering and clapping, and holding a huge sign that proclaimed 1½, for the number of one-sixth mile laps he'd completed. Leading the entourage was the attached flight surgeon, who seemed the happiest of them all.

Quick Stoppers

Authoritarian Autopilot

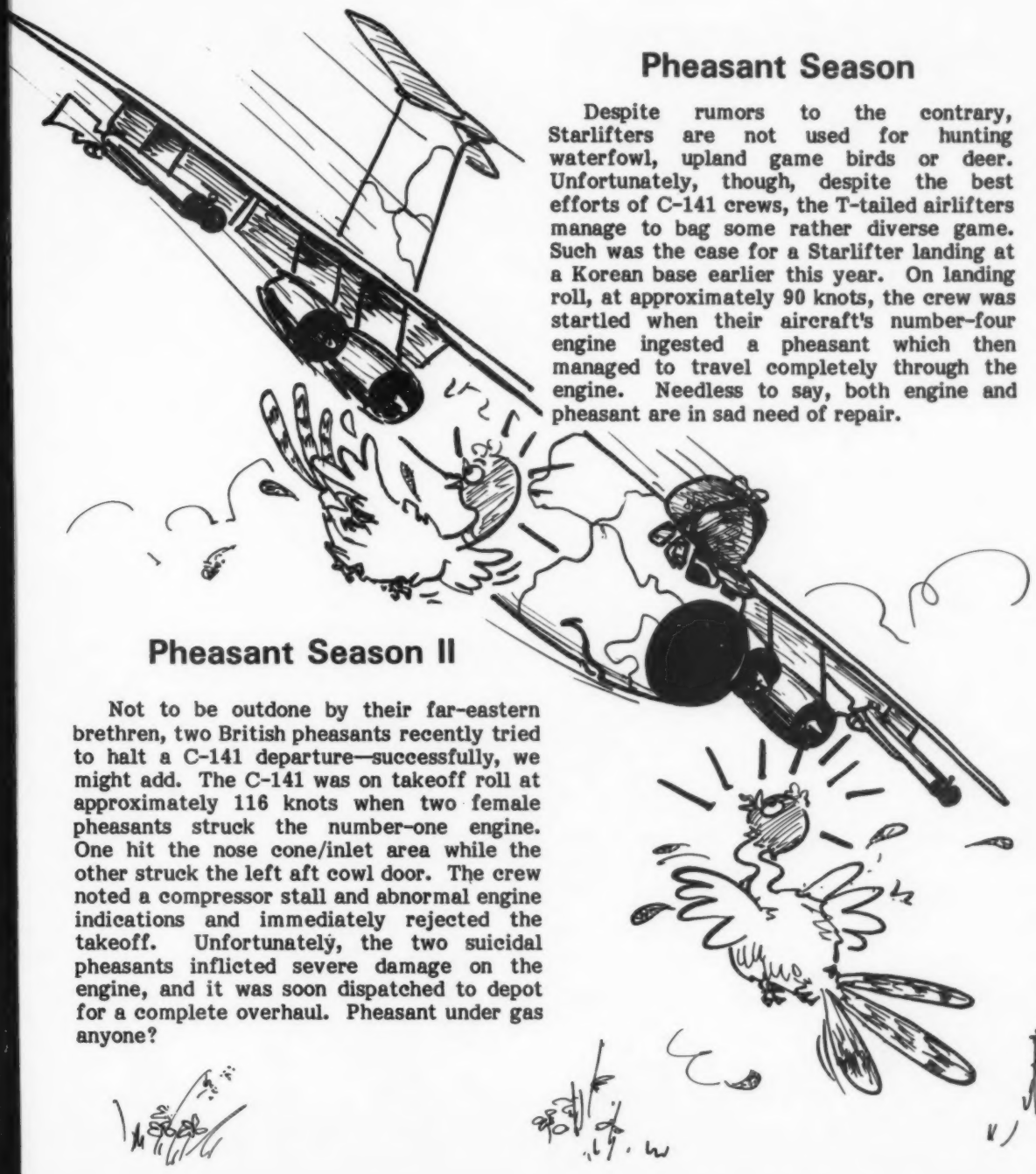
The aircraft commander is the boss aboard the aircraft—says so right on the orders. But those orders become null and void when a piece of aircraft equipment—in this case the autopilot—can take control. That's exactly what happened on a routine cargo run for a C-23 recently. Level at FL 100, the crew of the Sherpa was understandably surprised when the autopilot arbitrarily put the aircraft in a 5-10° right bank and a 5-10° nose low attitude. The pilot was able to maintain aircraft control by manually overpowering the autopilot. Meanwhile, both pilots tried to turn off the autopilot via the autopilot disconnect switches, but the black box was not inclined to disengage. After trying to override the system with electric trim (unsuccessful) and the center console autopilot control panel (also unsuccessful), the aircraft commander got tough with the unyielding autopilot. He pulled the circuit breaker. Removing electrical power finally broke the stalemate and allowed the AC to regain full control of his aircraft. The cause? Seems there was a small problem with the autopilot software. You Sherpa drivers can relax, though, a modification to the software is already being tested. There is no cause for alarm—alarm—alarm . . . .

Self Flagellation

Aircraft commanders are occasionally required to "crack the whip" to get their "cast-of-thousands" crews headed in the right direction. But have you ever heard of an aircraft doing that—much less to itself? Read on. The C-130E and its reserve crew were busily engaged in some airdrop practice. During either the opening or closing of the ramp, a tiedown strap partially exited the aircraft and became lodged with one end in the cargo compartment and the other end in the slipstream behind the aircraft. Unfortunately, the metal end in the slipstream began flailing about and in the process inflicted painful injury to the unprotected posterior of the Herky bird. The strap caused nearly $2,000 in sheet metal damage to the C-130 before it departed the aircraft. That's an expensive spanking.

Pheasant Season

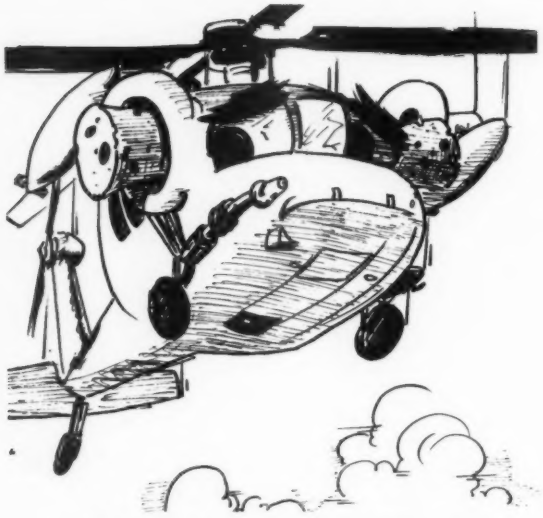
Despite rumors to the contrary, Starlifters are not used for hunting waterfowl, upland game birds or deer. Unfortunately, though, despite the best efforts of C-141 crews, the T-tailed airlifters manage to bag some rather diverse game. Such was the case for a Starlifter landing at a Korean base earlier this year. On landing roll, at approximately 90 knots, the crew was startled when their aircraft's number-four engine ingested a pheasant which then managed to travel completely through the engine. Needless to say, both engine and pheasant are in sad need of repair.



Pheasant Season II

Not to be outdone by their far-eastern brethren, two British pheasants recently tried to halt a C-141 departure—successfully, we might add. The C-141 was on takeoff roll at approximately 116 knots when two female pheasants struck the number-one engine. One hit the nose cone/inlet area while the other struck the left aft cowl door. The crew noted a compressor stall and abnormal engine indications and immediately rejected the takeoff. Unfortunately, the two suicidal pheasants inflicted severe damage on the engine, and it was soon dispatched to depot for a complete overhaul. Pheasant under gas anyone?

Quick Stoppers



Blackhawk Ear Block

Earblock? In a helicopter? How can that happen? Actually, quite easily. Today's modern rotary-winged wonders can get to some pretty amazing altitudes

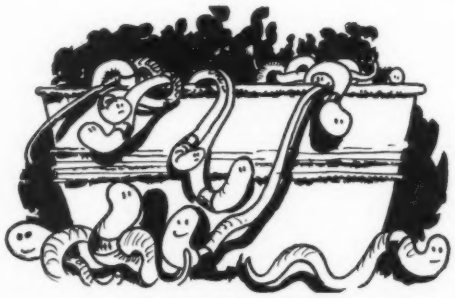
Well, during one recent flight as this particular UH-60 crew was descending from 13,000 feet, the flight engineer informed the crew that he had an earblock. The AC immediately leveled off and the flight engineer was able to clear his ears. So, the AC continued a shallow descent, but the flight engineer suffered another earblock. This continued, in fact, four or five more times before the helicopter finally landed. A flight surgeon met the aircraft, examined the flight engineer, whose ears were still blocked, and sent him to the nearest hospital.

The flight surgeon attributed the earblock to several factors. First, the flight engineer was a heavy cigar smoker. The cigar smoke irritated his throat and eustachian tubes, and the smoke and irritation caused the ear-blocks. The flight engineer was placed in DNIF status for 15 days and strongly advised to quit smoking. He did and has subsequently flown without incident.

Bucket of Worms

A complicated series of hydraulic problems confounded the crew of a C-130A several months ago—but their confusion was nothing like that of the maintainers trying to explain why it happened. The Herk was on a routine low-level training mission when the crew noticed both numbers-one and three engine driven hydraulic pump low-pressure warning lights had illuminated. The pilot quickly directed the associated pump switches be turned off in accordance with the tech order. The loadmaster confirmed the booster system reservoir was empty and soon reported what appeared to be a hydraulic leak on the number-four engine. He confirmed his suspicions by observing the utility reservoir quantity begin to fall. The pilot deftly directed shutdown of the number-four engine and the leak stopped. With the problem seemingly under control, the crew diverted to the nearest suitable field and landed without incident. But the story quickly got *very* interesting.

Upon examining the aircraft, the maintainers were amazed to find that someone had crossed connections on two hydraulic lines in the flap well just aft of the number-two engine. In a nutshell, this effectively tied the booster and utility hydraulic systems together and allowed both to be depleted when the hydraulic leak occurred on the number-four engine. Had it not been for the leak, though, the problem may have remained undetected indefinitely.



After Deadlines

FLIGHT DATA RECORDERS AND COCKPIT VOICE RECORDERS INSTALLED—Soon, mishap investigators for C-130 and C-141 aircraft will have additional help when both aircraft are modified to carry digital flight data recorders (FDR) and cockpit voice recorders. An FDR stores up to 25 hours of data on an aircraft's speed, altitude and attitude, as well as rudder and landing gear positions and other information. The FDR is built inside a hard case to enhance its survivability. The cockpit voice recorder will tape up to 30 minutes of conversation, then it recycles, taping over what had previously been recorded. Approximately 142 C-141s have the equipment, with installation on another 271 scheduled before December. About 185 C-130s have been modified, with installation on the rest of the fleet to begin in January.

SAREX 85 COMPETITION—440 Squadron, Canadian Forces Survival Training School, took first place in this annual Canadian/American rescue competition. The 1550 CCTW from Kirtland AFB, N.M., outscored all other U.S. Air Force teams in the contest, this year held in Edmonton, Alberta, Canada. The 1550 CCTW finished second in the pararescue category and also excelled in the search category. The 67 ARRS, RAF Woodbridge, England, took second in the medical exercise, which measures medical knowledge and ability. Beginning as a strictly Canadian search and rescue exercise, SAREX started in 1968, and U.S. units began participating in 1972. The exercise location now alternates between the US and Canada. The pararescue portion tests the jumper's skill in landing on a target, while the search portion checks a flightcrew's ability to locate an accident site.

TEAMWORK AND NIGHT VISION DEVICE TO THE RESCUE—The efforts of members from the 3 TFW, the 20 AAW and the 31 ARRS, all at Clark AB, RP, combined with the new technology in the succesful evacuation of a Peace Corps worker. The volunteer was seriously injured in an automobile accident on the southern tip of Leyte, about 425 miles southwest of Clark. Several hours had already elapsed by the time word from the Anawahan Hospital reached the 13 AF rescue center that the patient had a skull fracture and had a head wound. Immediate evacuation was critical, and two helicopters from the 31 ARRS responded in inclement weather at night. Normally, no attempt would have been made until daybreak, but that was before night vision goggles. After piloting his helicopter the nearly 300 miles to Leyte, Capt. Jack Snyder was able to penetrate through the weather to pick up the injured worker, thanks to the goggles. While the helicopter was enroute, a field adjacent the hospital was lit with torches made from rags dipped in oil. Time was short, so the injured man was transported to Mactan airfield, transferred to a C-9 and, finally, moved to Clark AB. This marked the first rescue in which the new goggles were used in the Pacific Theater.

CAPTAIN JOHN KELLY, 20 SOS, WINS KOLLIGIAN TROPHY—Capt. John F. Kelly, an HH-53 Pave-Low pilot, has been awarded the Koren Kolligian Trophy. Captain Kelly received the award for an outstanding feat of airmanship during an in-flight emergency he experienced on 14 Jun 1984. During a joint service training exercise, the tail rotor separated from his helicopter while flying with eight crewmembers and eight combat-configured troops aboard. During the harrowing descent, Capt. Kelly selected an emergency landing site, but as he approached, it became clear the site was populated. To avoid endangering ground personnel, Capt. Kelly steered his crippled aircraft away, found another site and recovered with no fatalities. For a more detailed account of this feat of excellent airmanship, see *TMF*, April 1985, page 20. Our congratulations to Capt. Kelly for an outstanding effort.

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